RELAPSING FEVER (*BORRELIOSIS*)

DISEASE REPORTING

In Washington

DOH receives 3 to 8 reports of relapsing fever per year. Exposures occur in eastern Washington or other western states and provinces where soft ticks are present.

Purpose of reporting and surveillance

- When the source is a risk for only to a few individuals (e.g., a vacation cabin), to inform those individuals how they can reduce their risk of exposure.
- To educate potentially exposed persons about signs and symptoms of disease and facilitate early diagnosis.

Reporting requirements

- Health care providers: **immediately notifiable to Local Health Jurisdiction**
- Hospitals: **immediately notifiable to Local Health Jurisdiction**
- Laboratories: no requirements for notification
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days

Clinical criteria for diagnosis

A febrile illness with temperature ≥100.5°F (38.0°C). A typical clinical presentation occurs following exposure in a rural setting and is characterized by a relapsing pattern of fever, chills, headache, and myalgias.

Laboratory criteria for diagnosis

- Identification of spirochetes on a peripheral blood smear by dark field microscopy, or
- Microscopic examination of a Wright-Giemsa-stained specimen, or
- Blood culture in special media.

CASE DEFINITION FOR SURVEILLANCE

Case definition

- Probable: A case with the typical clinical presentation that is not laboratory confirmed and is not epidemiologically linked to a confirmed case.
- Confirmed: A case that is laboratory confirmed, or that meets the clinical case definition and is epidemiologically linked to a confirmed case.

A. DESCRIPTION

1. Identification

A systemic spirochetal disease in which periods of fever lasting 2-9 days alternate with afebrile periods of 2-4 days; the number of relapses varies from 1 to 10 or more. Each febrile period terminates by crisis. The total duration of the louseborne disease averages 13-16 days; the tickborne disease usually lasts longer. Transitory petechial rashes are common during the initial febrile period. The overall case-fatality rate in untreated cases is between 2% and 10%.

Diagnosis is made by demonstration of the infectious agent in darkfield preparations of fresh blood or stained thick or thin blood films, by intraperitoneal inoculation of laboratory rats or mice with blood taken during the febrile period or by blood culture in special media.

2. Infectious Agent

In louseborne disease, *Borrelia recurrentis*, a Gram-negative spirochete. In tickborne disease, many different strains have been distinguished by area of first isolation and/or vector, rather than by inherent biologic differences. Strains isolated during a relapse often show antigenic differences from those obtained during the immediately preceding paroxysm.

3. Worldwide Occurrence

Characteristically, epidemic where it is spread by lice; endemic where it is spread by ticks. Louseborne relapsing fever occurs in limited areas in Asia, eastern Africa (Ethiopia and the Sudan), the highland areas of central Africa and South America. Tickborne disease is endemic throughout tropical Africa; foci exist in Spain, northern Africa, Saudi Arabia, Iran, India and parts of central Asia, as well as in North and South America. Sporadic human cases and occasional outbreaks of tickborne disease occur in limited areas of several western states (US) and western Canada.

4. Reservoir

For *B. recurrentis*, humans; for tickborne relapsing fever borreliae, wild rodents and argasid (soft) ticks through transovarian transmission.

5. Mode of Transmission

Vectorborne; not directly transmitted from person to person. Louseborne relapsing fever is acquired by crushing an infective louse, *Pediculus humanus*, so that it contaminates the bite wound or an abrasion of the skin. In tickborne disease, people are infected by the bite or coxal fluid of an argasid tick, principally *Ornithodoros hermsi* and *O. turicata* in the US, *O. rudis* and *O. talaje* in Central and South America, *O. moubata* and *O. hispanica* in Africa and *O. tholozani* in the Near and Middle East. These ticks usually feed at night, rapidly engorge and leave the host; they have a longevity of 2-5 years and remain infective for their lifespan.

6. Incubation period

From 5 to 15 days; usually 8 days.

7. Period of communicability

The louse becomes infective 4-5 days after ingestion of blood from an infective person and remains so for life (20-40 days). Infected ticks can live for several years without feeding; they remain infective during this period and pass the infection transovarianly to their progeny.

8. Susceptibility and resistance

Susceptibility is general. Duration and degree of immunity after clinical attack are unknown; repeated infections may occur.

B. METHODS OF CONTROL

1. Preventive measures:

a. Control lice by measures prescribed for louseborne typhus fever (see Typhus fever, Epidemic louseborne, B1).
b. Control ticks by measures prescribed for Rocky Mountain spotted fever, 9A. Tick-infested human habitations may present problems, and eradication may be difficult. Rodent-proofing structures to prevent future colonization by rodents and their soft ticks is the mainstay of prevention and control. Spraying with approved acaricides such as diazinon, chlorpyrifos, propoxur or permethrin may be tried.
c. Use personal protective measures, including repellents and permethrin on clothing and bedding for people with exposure in endemic foci.

d. Antibiotic chemoprophylaxis with tetracyclines may be taken after exposure (arthropod bites) when the risk of acquiring the infection is high.

2. Control of patient, contacts and the immediate environment:

a. Report to local health authority.
b. Isolation: Blood/body fluid precautions. The patients, their clothing, all household contacts and the immediate environment should be deloused or freed of ticks.
c. Concurrent disinfection: None, if proper disinfestation has been carried out.
d. Quarantine: None.
e. Immunization of contacts: None.
f. Investigation of contacts and source of infection: For the individual tickborne case, search for additional associated cases and for sources of infection; for louseborne disease, application of appropriate lousicidal preparation to infested contacts.
g. Specific treatment: Tetracyclines.

3. Epidemic measures

For louseborne relapsing fever, when reporting has been good and cases are localized, apply 1% permethrin dust or spray (an insecticide with residual effect) to contacts and their clothing, and permethrin spray at 0.003-0.3 kg/hectare (2.47 acres) to the immediate environment of all reported cases. Provide clothes washing and bathing facilities for the affected population; establish active surveillance. Where infection is known to be widespread, apply permethrin systematically to all people in the community. For tickborne relapsing fever, apply permethrin or other acaricide to target areas where vector ticks are thought to be present; for sustained control, a treatment cycle of 1 month is recommended during the transmission season.

4. International measures

a. Telegraphic notification by governments to WHO and adjacent countries of the occurrence of an outbreak of louseborne relapsing fever in an area previously free of the disease.
b. Louseborne relapsing fever is not a disease subject to the International Health Regulations, but the measures outlined in B4a, above, should be followed since it is a Disease under Surveillance by WHO.